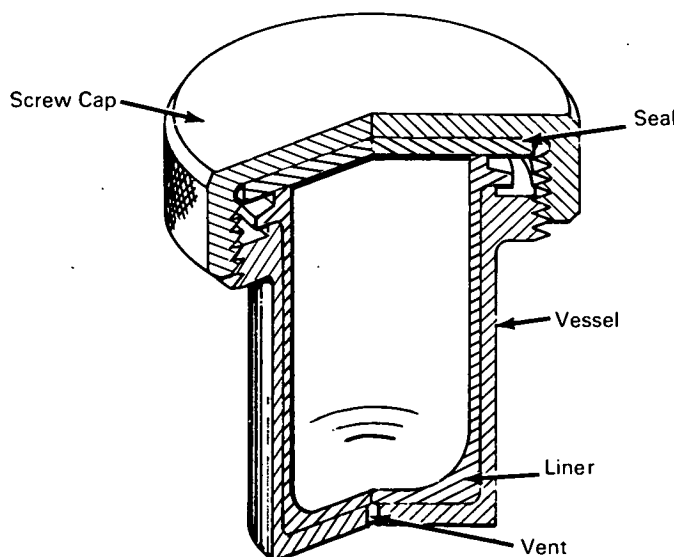


NASA TECH BRIEF



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Decomposition Vessel



The problem:

To design a simple, reliable vessel that would permit rapid decomposition of silicates and other refractory compounds by acids at relatively low temperatures. The vessel must ensure that no losses occur during the decomposition by the escape of potentially volatile constituents. In previous devices, tapered openings were sealed by tapered stoppers, each being faced with relatively inert plastic coatings which deformed appreciably after repeated use. This required frequent remachining of the sealing area or trimming of extruded plastic edges or both.

The solution:

A stainless steel crucible-shaped vessel, lined with an appropriate thickness of tetrafluoroethylene (TFE) fluorocarbon resin and sealed by a sheet of the same material retained in a stainless steel screw cap.

How it's done:

In one application, a TFE crucible-shaped vessel is inserted into a closely mating stainless steel body. The assembly's sealing area consists of a dimensionally optimized TFE rim riding on the top of the stainless steel body, and interfacing the TFE sheet held in the screw cap. Perfect sealing is achieved by merely installing the screw cap in place and securing it to the body threads by screw-winding hand pressure.

Notes:

1. Using this device, the following materials were decomposed completely at relatively low (170°C or less) temperatures: niobium diboride, titanium diboride, and silicon nitride. Aluminum dodecaboride and aluminum oxide partially decomposed.

(continued overleaf)

2. The vessel does not undergo dimensional changes which could interfere with its reliable and continuous use and leak-proof performance.
3. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Goddard Space Flight Center
Greenbelt, Maryland 20771
Reference: B68-10104

Patent status:

Title to this invention has been waived under the provisions of the National Aeronautics and Space Act [42 U.S.C. 2457 (f)], to Mr. Bedrich Bernas, of the National Academy of Sciences, 2101 Constitution Avenue, Washington, D.C. 20418.

Source: Bedrich Bernas
of National Academy of Sciences
under contract to
Goddard Space Flight Center
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